

Discussion on Dust Prevention and Control in Coal Mining Face

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Abstract

With the progress of science and technology in China, it has promoted the progress of coal mining technology, especially in automatic mining has made significant progress, but it also increases the dust pollution of coal mining working face, which not only seriously harms the occupational health of operators, but also affects production safety. Therefore, the main task at this stage is to promote the development and application of dust prevention and control technology, through the adoption of corresponding technical measures, and from the perspective of management to ensure the effective implementation and development of dust prevention and control work.

Keywords

Coal Mining Face; Dust Pollution; Dust Prevention Technical Measures.

1. Introduction

Coal mine mechanization production process, will produce large amounts of dust, diffuse in the whole business environment, serious pollution to the environment of the coal mining, cause a harm to workers health, also influence coal mining equipment operation, which affects the work efficiency, at the same time, to a certain extent, reduces the visibility of coal mining work site, easy to cause the production safety accidents, It can even cause coal dust explosions [1]. Although the technical level of coal mining in China has been improved in recent years, and the attention to occupational health has been raised, dust prevention and control work is still a long way to go. In the aspect of dust prevention and control in coal mining face, it is necessary to increase the research efforts, and take effective prevention and control technical measures, and strengthen the supervision and management of dust prevention and control work.

2. Technical Measures for Dust Prevention and Control in Coal Mining Face

2.1 Dust Source Dust Suppression Technology

Respiratory dust has a great impact on the occupational health of workers, and is the main factor causing dust occupational diseases (pneumoconiosis, silicosis). Therefore, the aim of dust prevention and control is to reduce the concentration of respirable dust. Dust source suppression technology is a technology to control dust generation at the source. At present, relatively effective dust source suppression technology generally adopts coal seam water injection, water seal blasting and corresponding coal mining technology [2].

Coal seam water injection is through drilling the high-pressure water into the coal seam, can make the coal seam to obtain more adequate water, can suppress the dust in the process of coal mining in the fundamental source. Coal seam water injection is the most effective measure to reduce dust before mining. By increasing the water content of coal seam and wetting the surface of coal seam, the surface of coal seam is softened, so as to reduce the planktic dust produced by coal seam mining. This is the first measure of dust prevention and control, and also a relatively effective way of dust prevention and control measures at the present stage. In this way, the concentration of dust can be reduced by

about 60% [3]. There are many working faces of coal seam water injection technology adopted abroad, but the application and popularization of coal seam water injection technology in China is not enough. Especially with the development of recent years, for fracture development is poorer, or coal seam gap to the concrete conditions of coal seam water injection is more difficult in our country's relevant departments have gradually established a relatively perfect method and measures, which to a certain extent, water for effective control of the coal layer, as well as to the coal layer of dust control effectively.

2.2 Air Curtain Technology

Air curtain is a new type of dust control technology, jet equipment on coal mining equipment, jet equipment along with the exploitation of synchronous operation, air flow in mining, through which the air flow outside dividing the dust in the air, thus in a air barrier formed between mining equipment and staff, to a certain extent, control dust produced in the process of mining, Avoid spreading to the operator area and protect the occupational health and safety of the operator. Through the air curtain technology, a protective barrier of air is formed and dust is isolated through this barrier [4].

2.3 Spray Dust Removal Technology

Spray dust removal technology has high practicability, and the dustproof effect is excellent, is also a more widely used way in coal mining face at present. In the actual mechanized coal mining process, the effective application of coal shearer and tunneling equipment spray dust removal technology has become an important content of the dust prevention work of mechanized coal mining at the present stage [5]. In this regard, the corresponding roller rocker dust removal technology can be adopted to form a relatively large fog flow barrier, and further reduce the dust generated in the process of coal cutting in the roller. At the same time, the technology of internal and external spray dust removal should be strengthened, so as to realize the transformation from traditional technology to modern technology. But for this technology, it is usually because the internal spray is blocked, and the normal dust removal work cannot be done. For this, scientific research institutions developed a filtration system, specifically to solve the blockage of spray dust, so that the water becomes cleaner and healthier. For high pressure external spray technology, usually applied in western countries, the dust removal effect is about 50%, and only a small part of China has used this high pressure external spray technology. This technology is effectively analyzed by the principle of high pressure spray dust removal technology and spray dust removal technology. Not only that, spray suction device for dust content areas spray fog flow more dust, or in after injection, to form a negative pressure zone, in addition, you can also through spraying and the tail end of the air with dust suction, vacuum negative pressure field can be formed, and through the jet spraying device, in this case, to minimize the concentration of dust in coal mine. At the same time, this technology is relatively simple, and has a strong operation effect, can to a certain extent to avoid dust air pollution caused by shearer and construction environment.

2.4 Dust Extraction and Purification Technology of Dust Collector

For the problem of dust prevention and control in coal mining working face, dust and air can be effectively isolated, control dust diffusion, and then use the dust extraction and purification technology of dust collector, to a certain extent, play the role of air purification. Dust remover extraction and purification technology is widely used in China's coal mining industry, mainly for wet filter, wet cyclone dust remover, washing dust remover, etc. These dust remover has the advantages of high dust removal efficiency, high dehydration efficiency, small volume, low noise. Research shows that in recent years, the wet dust collector technology in China's coal industry has achieved rapid development, and a variety of different types and specifications of dust collectors and supporting technologies have been developed, and their application and promotion in the dust prevention and control of coal mining face [6].

3. Ensure the Effective Implementation of Dust Control Measures from the Perspective of Management

Through the relevant investigation and research shows that in the dust prevention and control work in each coal mine production stage, are inseparable from the corresponding supervision system, if the supervision of the work did not do, can not carry out effective management of the relevant work content. In the process of coal mine production, the specific supervision work is carried out step by step. Therefore, relevant departments and personnel must establish a perfect supervision and management system. With the development of China's economic market, there are many hidden dangers in coal mine production safety, especially the work of dust supervision quality standard system in the process of coal mining has not been carried out smoothly. Therefore, in the establishment of perfect supervision and management system is very necessary. According to the actual situation of coal mining work, the management institutions should set up a corresponding system of rewards and punishment, so that you can to a certain extent, promote the dust supervision and inspection work, at the same time of establishing supervision system, to perfect the relevant personal rewards and punishment system, to assist in regulatory departments conduct supervision and management work. For China's coal mining work, the performance good staff, but not to punish the violations of relevant employees, and in the process of coal mining and concrete production, also want to strictly regulate the relevant rewards and punishment system, strictly punish illegal workers, can to a certain extent, arouse the enthusiasm of the staff, It can also promote the smooth progress of dust prevention and control in the process of coal mining.

4. Conclusion

Currently, dust and dust removal work is a major challenge facing the coal mining industry, in order to further ensure the scientific nature and security of the coal mining, and to dust and dust removal technology system research, through the use of advanced technology and process to be perfect, so as to improve dust control efficiency to some extent. On dust control technology measures, through the dust from the air effectively, reasonable use filter smoke dust purification technology, which to a certain extent, have the effect of clean air, and to reduce the dust concentration, reduce the production of dust source, based on the methods and measures, to control coal layer of water and dust, in addition, Through air curtain technology and spray dust removal technology, the content of coal dust is reduced to a minimum, so as to avoid space pollution. Not only that, but also to establish a relatively perfect supervision and management system, effective management of the staff, and the establishment of a strict reward and punishment system, can mobilize the enthusiasm of the staff, so as to ensure the smooth development of coal mining face dust prevention and control work.

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